ENGINEERS WITH
SOCIAL RESPONSIBILITY

M.Tech. (ICT)
with specialization in
VLSI & Embedded Systems

Academics

Service to Society

DA-IICT

Research & Innovation

DA-IICT was founded in 2000 as a unique university devoted to the cutting-edge interdisciplinary area of Information and Communication Technology (ICT). ICT was emerging as the technology of the future bringing in the fourth Industrial Revolution. Well known and highly qualified faculty members joined DA-IICT and developed a curriculum and research program steeped in all aspects of ICT, societal, scientific, and technical. This spirit has been nurtured for the last 23 years and DA-IICT wants to continue its excellence in interdisciplinary teaching and research well into the future.

The Act No. 6 of 2003 of the Gujarat Legislature provided for the establishment of the DA-IICT and conferred on it the status of a University. On 30 November 2004, the DA-IICT was included in the list of Universities maintained by the University Grants Commission under Section 2(f) of the UGC Act, 1956. DA-IICT is a member of the Association of Indian Universities (AIU) as approved by the AIU at its 84th Annual Meeting held during 12-14 November 2009. The National Assessment and Accreditation Council, Government of India has accredited DA-IICT with an **A$^+$ Grade in 2023**.

Vision and Mission
The vision of the institute is to become a globally recognized institution that offers innovative programs, outstanding faculty, an atmosphere of innovation, a responsive administration, a vibrant campus and a collaborative learning environment that continuously adapts to the changing landscape of research and innovation and the future of work. Toward this, we plan to design and deliver academic programs in both disciplinary and multidisciplinary domains to prepare students for a rapidly evolving work environment.

Ranked among top 100 Engineering Institution by MHRD, Govt of India (NIRF-2019 rankings)

**NAAC (Accreditation): A$^+$ Grade (Year- 2023)
Selected for Center of Excellence award
Annual Student Scholarships: INR 3-4 Crores**

First Private University to mentor PPP model based (central, state and industry funded) Institute - IIIT Vadodara (build academics and provided faculty support)

Only **Anchor Institute** in Gujarat to mentor the Faculty members of Engineering Colleges in Gujarat

Awarded the **Best University** in Innovation in Gujarat by Govt. of Gujarat in 2017
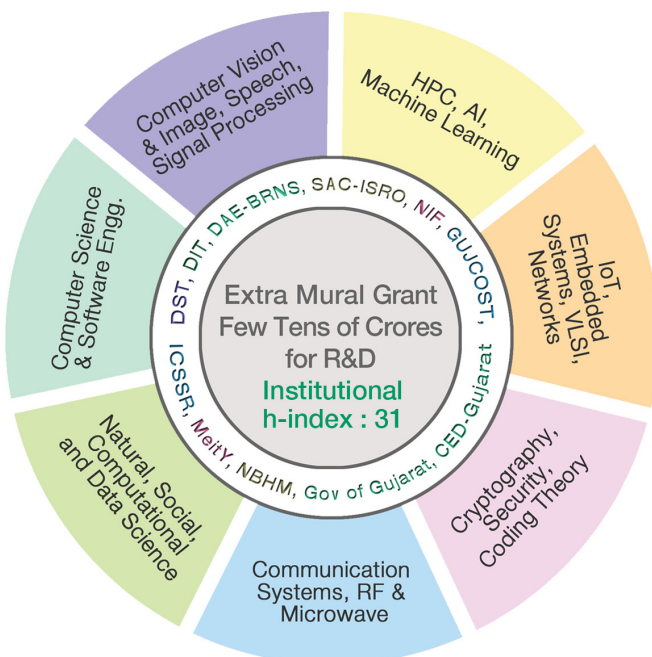
Academics and Research at DA-IICT

Interdisciplinary and Multidisciplinary Research Oriented Academic Programs

Level	Name of the Program	Duration	Unique Features
Doctoral	PhD	4-6 years	- Entry through national level entrance test & interview - Fellowship (PM) **INR 35000 - 40000**
PG	MTech (ICT)	2 years	- Four specializations: **ML, SS, VLSI** & **ES** and **WCSP**
	MSc (IT)	2 years	- Industry oriented IT program
	MSc (Data Science)	2 years	- Hands-on & case study-based program
	MSc (Agriculture Analytics)	2 years	- In collaboration with **AAU, IIRS**
	MDes (CD)	2 years	- Fusion of ICT and Design
UG	BTech (ICT)	4 years	- 1st Institute in India to offer **unique program** in ICT in 2001
	BTech (Hons in ICT; minor in Computational Science)	4 years	- 1st Institute in India to offer UG program in Computational Science
	BTech (Mathematics and Computing (MnC)	4 years	- Intersection of Computer Science & Applied Mathematics to solve complex problems
	BTech (EVD) Electronics & VLSI Design	4 years	- 1st Institute in Gujarat to offer

Computer Vision & Image, Speech, Signal Processing — HPC, AI, Machine Learning — Computer Science & Software Engg. — IoT, Embedded Systems, VLSI, Networks — Natural, Social, Computational and Data Science — Cryptography, Security, Coding Theory — Communication Systems, RF & Microwave

DST, DIT, DAE-BRNS, SAC-ISRO, NIF, GUJCOST, CED-Gujarat, Gov of Gujarat, NBHM, MeitY, ICSSR

Extra Mural Grant Few Tens of Crores for R&D
Institutional h-index : 31

International Projects
NSF-USA, Indo-French, Indo-Spain

Industry / Consultancy Projects
nVIDIA (USA). FactSet (UK), Vista (India), ISRO Amnex Technology, GoG (Climate Dept.)

Major MOUs / LOUs
Univ. of Oregon (USA), Univ. of Auckland (NZ),
Univ. of Swaziland (UoS), Univ. of Dayton (USA),
Univ. of Hildesheim (Germany),Univ. Mara (Malaysia)
Univ. of Evora (Portugal), ISEP (France),
ISRO, Indian Navy, ISI Kolkata, TCS, Samsung
R&D, IIT Gandhinagar, IIT Jammu, IIIT Vadodara,
C R Rao AIMSCS, EDII

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Very-large-scale integration (VLSI) is the process of integrating or embedding millions of transistors on a single silicon semiconductor chip. VLSI technology is promising due to its high packing density, high speed and low power consumption. Embedded Systems is a domain where VLSI technology is used to build an application specific system and meet user requirements. VLSI and Embedded systems have opened up avenues in various fields such as aerospace, agriculture, automobile, consumer electronics, biomedical and many others. As per the statistics provided by Dr. Handel Jones, International Business Strategies (IBS) global VLSI/Semiconductor market revenue will approximately hit $600B by 2025. This revenue will be mainly derived from Internet of Things (IoT) semiconductor hardware and sensor market, semiconductor foundry, DRAM, Flash memory and Embedded Systems. Thus, VLSI and embedded systems play a major role in offering the best job opportunities.

In order to support research and development for the VLSI and Embedded System industry, it is desirable to have a knowledge of semiconductor physics, IC fabrication technology, analog and digital design, low power VLSI circuits, Embedded Systems etc. Thus, in summary VLSI and Embedded Systems (VES) is one of the important components of the Information and Communication Technology (ICT) discipline.

The VES research group of ICT department in DA-IICT encompasses wide spectrum ranging from Microelectronics, Digital and Analog Integrated Circuits, VLSI Electronic Design Automation to Nanotechnology, MEMS and Embedded systems. The department has excellent research laboratories with availability of various state-of-the-art CAD tools, low power system testing, PCB fabrication facility to carry out research. The core research areas and on-going projects are in the areas of

- Processor design and implementation, Low Power VLSI design, AI/ML in edge computing and HPC
- Hardware security primitives, Hardware Security Modules (HSM) for Industrial IoT, Machine learning based solutions for Hardware Trojan detection and prevention, Design and modelling of MEMS sensors
- Digital VLSI Architecture Design for High Performance Computer Arithmetic and Signal Processing Algorithms
- Ultra Low Power and Sub-threshold
- Circuit Methodologies, Very Low Voltage Circuits for Wireless Sensor Networks, Power Management for Energy Harvesters, Signal Processing Hardware for Color Image Processing
- Chip design for application-oriented domains and embedded systems in areas, namely, military, automotive and agriculture
- Digital VLSI design, Nanotechnology, Flexible electronics, Numerical Methods, Circuit and system design for bio-medical applications, System design for agriculture modernization, Graphene Interconnects and devices
- MEMS, Sensor & System Design, IoT, Sensors Signal Conditioning, Self-healing Systems
- Intelligent system and VLSI circuit engineering, Robotics

The research carried out by the VES group has culminated into various publications in journals, conferences and book chapters of international repute, bringing several funded projects and incubation of many start-ups. The department has experienced faculty and dedicated labs for supporting Ph.D. and M.Tech. curriculum in VLSI and Embedded Systems. The program provides wide range of core VES subjects together with many electives from domains such as Machine Learning, Signal Processing and IoT to make the program more comprehensive and dynamic.

Program Overview

The important takeaways of the M.Tech. program in Machine Learning are as follows:

Choice based curriculum: Flexibility to register for courses of your choice along with other compulsory courses:

- To strengthen the foundation of ML through courses listed under Specialization Core and Specialization Electives

- To broaden knowledge through courses listed under General Electives

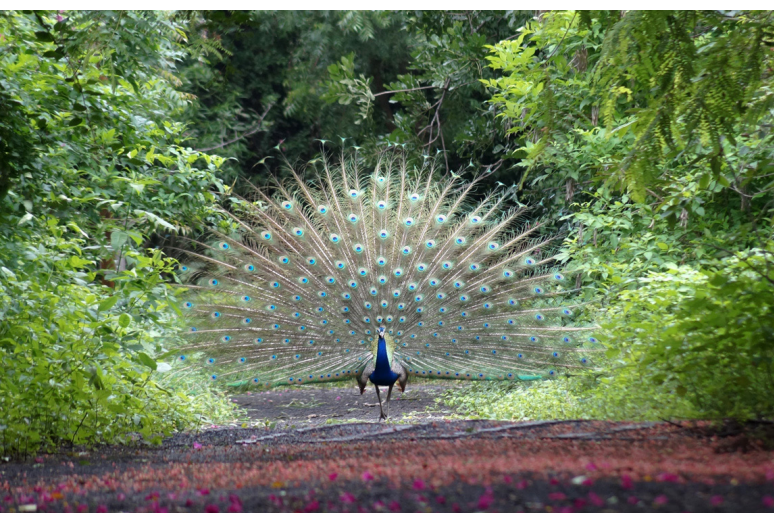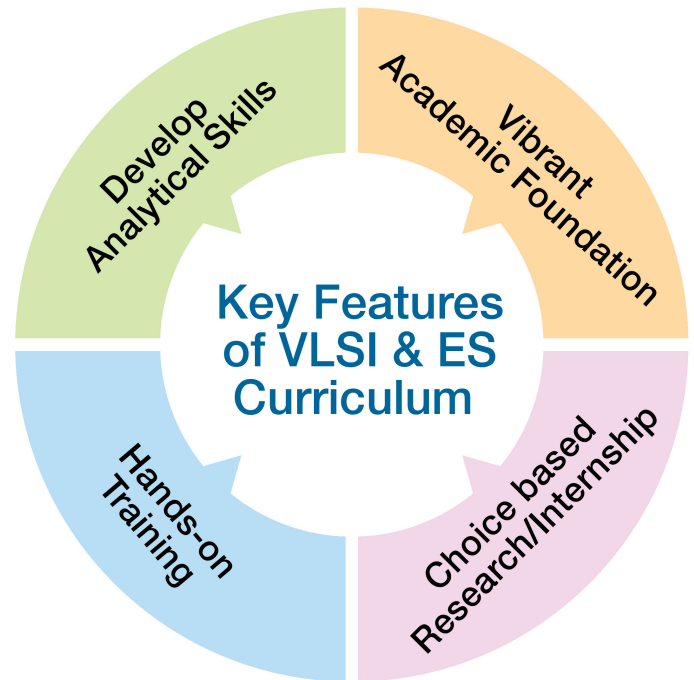**Hands-on Exposure through Minor Project-I**: Equips students to be ready for contesting job positions in industry.

Research Exposure through Major Project-I: Allows students to get an exposure on how to handle a project through a systematic approach based on the principles of carrying out a formal research assignment.

Flexibility in Semester-IV to prioritize Research Track through Major Project-II (for higher studies) over exclusive Industry Internship or vice versa: Students may extend their research progress culminating into a thesis, or may choose to pursue industry internships depending upon their inclination.

Key Features of VLSI & ES Curriculum

Develop Analytical Skills

Vibrant Academic Foundation

Choice based Research/Internship

Hands-on Training

Program Structure

Characterization of program:

This program has an intersection of VLSI and Embedded Systems with machine learning, IoT and sensor net¬works.

The key attractive features of **VLSI & ES** curriculum at DA-IICT Gandhinagar are as follows:

To build a vibrant academic foundation: Courses in the PG curriculum enable the students to get a fine grip over the foundation courses of VLSI and Embedded Systems

Develop analytical skills: The knowledge gained through coursework is further exemplified through ex tensive usage of VLSI CAD tool suites for chip design and prototyping intelligent embedded systems to carry out projects

Familiarization with state-of-the-art skill sets: Both Minor and Major projects are developed as part of the curriculum to enable students gain hands-on training of applying their theoretical knowledge to practice, thereby

- Increasing the scope of employability in industry
- Equipping students better to pursue higher studies

Uniqueness of the program:

- The fourth semester is made available for students to pursue internship in industry/academia, or to extend their research work from the previous semesters
- Encourage students to enrich their curriculum knowledge with hands-on experience using Python including Keras, Tensorflow and PyTorch
- Foundation course on Mathematics made compulsory in Semester-I to empower and broaden the knowledge spectrum and fulfill the current information technology demands

Program Structure and Objectives

Coursework Specific Details:

The coursework subjects are categorized under 3 broad headings:

Specialization Core: Courses in this basket are designed to build a strong foundation on VLSI and ES specific courses

General Elective: Courses in this basket are designed to broaden the knowledge spectrum in VLSI & ES

Specialization Elective: Courses in this basket shall enable to delve into the deeper realms of thecurriculum, and aid in specializing across different sub-domains

Project Specific Details:

Minor Project (Hands-on experiments): VLSI & ES coursework knowledge gathered in Semester-I are trans lated to hands-on experiments in minor project of Semester-II for enhancing the analytical capabilities of the students

Major Project I (Summer) (Research exposure): Comprises completion of literature survey, finalizing problem definition, and clearly defining the motivation, objective and scope of the project during the summer (after completion of the first year)
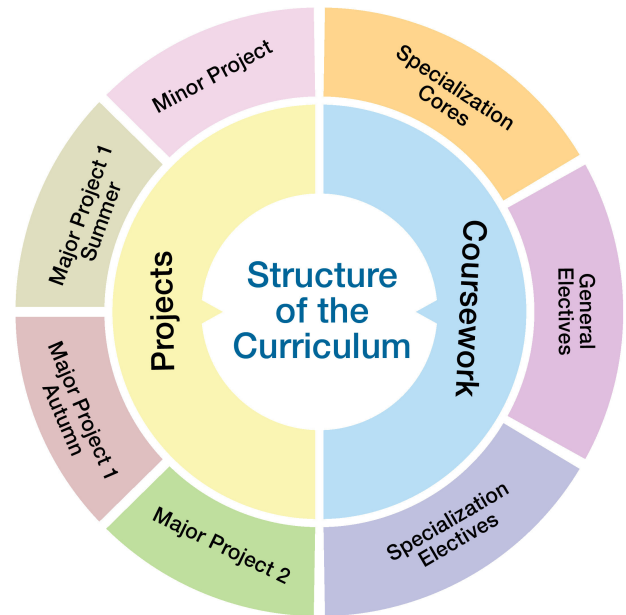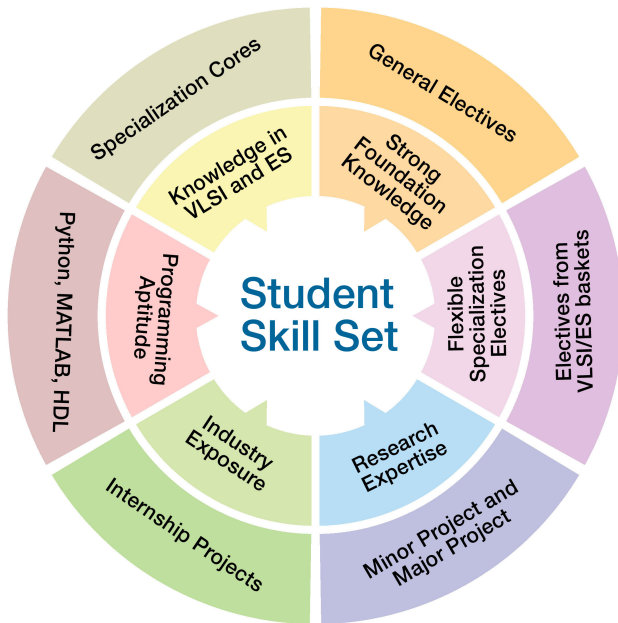
Major Project I (Autumn): Scheduled in Semester-III, it is preferably an extension of Major Project I

Major Project II (optional): An extension of the project work carried out in previous semesters, culminating into a thesis

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Student Skill Set
- Specialization Cores
- General Electives
- Knowledge in VLSI and ES
- Strong Foundation Knowledge
- Python, MATLAB, HDL
- Programming Aptitude
- Flexible Specialization Electives
- Electives from VLSI/ES baskets
- Industry Exposure
- Research Expertise
- Internship Projects
- Minor Project and Major Project

Structure of the Curriculum
- Minor Project
- Specialization Cores
- Major Project 1 Summer
- Projects
- Coursework
- General Electives
- Major Project 1 Autumn
- Specialization Electives
- Major Project 2

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Autumn Semester (Semester-I)

Course Name	Credits (L-T-P-C)
General Elective – Mathematics	3-0-0-3
Communication Skills and Technical Writing	2-0-0-2
Programming Lab	1-0-4-3
Specialization Core I: VLSI System Design	3-0-2-4
General Elective – Technical	3-0-0-3
*Choose from the general elective baskets	

Winter Semester (Semester-II)

Course Name	Credits (L-T-P-C)
Specialization Core II: Embedded Hardware Design	3-0-2-4
Specialization Elective I: Choose one	3-0-0/2-3/4
1. ASIC Design	
2. Analog VLSI Design	
Specialization Elective II: Choose one	3-0-0/2-3/4
1. Digital System Architecture	
2. Internet of Things	
Minor Project	0-0-6-3

Summer

Course Name	Credits (L-T-P-C)
Major Project I (Summer)	0-0-8-4

Autumn Semester (Semester-III)

Course Name	Credits (L-T-P-C)
Specialization Elective III-IV: (Choose any two)	3-0-0/2-3/4
VLSI Testing and Verification	3-0-0/2-3/4
Low Power VLSI Design	
VLSI for Digital Signal Processing	
Device Modeling and Simulation	
Edge Computing	
Nanoelectronics	
Major Project I (Autumn)	0-0-12-6

Winter Semester (Semester-IV)

Course Name	Credits (L-T-P-C)
Major Project II / Industrial Training Project	0-0-24-12

General Electives – Mathematics in the areas of:
Linear Algebra, Probability and Random Variables

General Electives – Technical in the areas of:
Machine Learning, Embedded AI, Robotics, Embedded Operating System
Digital Design using HDL and FPGA

All India Category: Total Seats: 11

GATE 8 & Non-GATE 3

Gujarat Category: Total Seats: 5

Eligibility Criteria

GATE Qualified candidates

A candidate with a qualifying degree in any one of the following:

- BE/BTech (CS/IT/EL, ECE, Electrical, Instrumentation)
- M.Sc. degree in Computer Science / Electronics / Mathematics / Physics / Statistics
- M.S./M.Sc. degree of DA-IICT
- M.C.A. degree (3 year program)

The aggregate marks in the qualifying degree should not be less than 60% or equivalent as per the norm set by the degree awarding Institute/University.

Non-GATE candidates
- MSc (CS), MCA, BE/BTech (CS, IT, CSE)

The aggregate marks in the qualifying degree should not be less than 65% or equivalent as per the norm set by the degree awarding Institute/University.

Candidates appearing in their final degree examination and expecting to complete it by July 2024 may also apply. However, their final admission will be subject to the condition that they obtain an aggregate of marks required based on mode of admission i.e. GATE/Non-GATE, or its equivalent as per the norms set by the degree granting Institute/University. All admitted candidates have to submit their degree certificates or proof of completion of degree, before 30 October 2024 failing which their admission is liable to cancellation.

Age: There is no age limit applicable to this program.

Selection Process

Admission to All India category of M. Tech. (ICT) with specialization SS, ML, VLSI&ES and WCSP will admit candidates through two channels: GATE and NON-GATE.

Admission through GATE Channel:

Candidates who have a valid GATE score in the disciplines of Electronics & Communication Engineering (EC), Electrical Engineering (EE), Computer Science & Information Technology (CS), Instrumentation Engineering (IN) and Data Science & Artificial Intelligence (DA), only can apply.

The final merit list for admission will be prepared on the basis of valid GATE score only.

Specialization GATE Discipline
- Machine Learning (CS/EC/EE/DA)
- Software Systems (CS)
- VLSI and Embedded Systems (EC/EE/IN)
- Wireless Communication & Signal Processing (EC)

Admission through Non-GATE Channel:

The selection of candidates in Non-GATE category will be based on the entrance test to be conducted at selected centers all over the country. The tentative list of centers is: DAIICT Gandhinagar, Ahmedabad, Bhopal, Bengaluru, Chennai, Mumbai, Hyderabad, Patna, Jaipur, Kolkata, New Delhi, Pune, Rajkot, Surat, Udaipur, Bhavnagar, Bhilai, Bhubaneswar, Chandigarh, Guwahati, Jammu, Kochi, Lucknow, Pant Nagar, Porbandar, Ranchi and Vijayawada. The final merit list for admission will be prepared on the basis of the aggregate score in the entrance test.

Admissions

The candidates can give up to two preferred specializations based on their eligibility conditions. Counseling for allotment of the specialization will be done online. Applicants are advised, from the date of announcement of first merit list, to check for e-mail communications from the Institute to learn about the admission status and steps they need to take to continue with the counseling process.

Note: The decision of the Competent Authorities of DA-IICT regarding eligibility and selection of any candidate shall be final.

How to Apply
Candidates submit an online application by clicking on the link given on the Institute website.

Admission Offer
The short-listed candidates will be offered admission (confirmed/waitlisted) in order of their merit.

Important Dates
Online application website opens
                        14th March 2024
Last date for submission of online applications
                        20th May 2024
Entrance test for Non-GATE Category
                        16th June 2024

For Inquiries
Email: pg_admissions@daiict.ac.in
Voice call: 079 69 08 08 08
For more details please visit: www.daiict.ac.in

Fees Structure*
At the time of admission an amount of Rs. 96,000/- (Rs.71,000/- towards Tuition Fee for the First Semester and Rs. 25,000/- towards Caution Deposit) is to be paid. The registration fee is payable at the time of registration and hostel rent on allotment of the hostel room.

Tuition fee	Rs. 71,000 per Semester
Registration Fee	Rs. 2,500 per Semester
Caution Deposit	Rs. 25,000 (Refundable at the end of the program)
Hostel Rent	Rs. 27,500 per semester
Food	On actuals. There are multiple food options available in the campus (The expense will be approximately Rs.5,500 pm)

*Subject to revision every Academic Year from 8 to 10%.

Education Loan
The Institute will facilitate the students to avail educational loan from selected Banks. The bank officials will be present on campus at the time of registration of admitted students so as to enable the students to obtain details on procedures and terms and conditions of the loan. The students can also avail loan from banks of their choice and in either of the case; the Institute will extend support in completing the loan documentation process.

Financial Assistance
All GATE admitted students would be eligible for a monthly stipend of Rs. 12400/- in the form of Teaching Assistants in the first semester. In subsequent semesters, the continuation would depend on their satisfying the academic requirements.